IN THE CLAIMS

What is claimed is:

1.   An integrated circuit device, comprising:

a programmable portion comprising a plurality of circuits that may be configured by a user of the integrated circuit device; and

at least one communication portion comprising at least one circuit block manufactured to perform a predetermined data communication function.

2.   The integrated circuit device of claim 1, wherein:

the programmable portion comprises a programmable interconnect portion and a logic gate portion.

3.   The integrated circuit device of claim 2, further including:

a memory circuit for storing configuration information for configuring circuits of the programmable portion.

4.   The integrated circuit device of claim 2, further including:

a timing circuit that receives a clock signal and generates an internal clock signal that is phase shifted with respect to the clock signal.

5.   The integrated circuit device of claim 1, further including:

a plurality of input/outputs commonly connected to the programmable

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3   portion and the communication portion.

1   6.   The integrated circuit device of claim 1, wherein:

2   the communication portion includes a plurality of data operation

3   circuits, each of which performs a different function on received input data.

1   7.   The integrated circuit device of claim 6, wherein:

2   the data operation circuits include a block converter circuit that may

3   convert an input data word into an output data word having different bit

4   values than the input data word.

1   8.   The integrated circuit device of claim 6, wherein:

2   the data operation circuits include a scrambler circuit that may perform

3   a scramble operation on the received data that may be represented by a

4   scrambling polynomial.

1   9.   The integrated circuit device of claim 6, wherein:

2   the communication portion further includes an operation control store

3   that provides one of a plurality of operational values to the data operation

4   circuits that controls the type of operation performed on the received data.

1   10. The integrated circuit device of claim 9, wherein:

2   the data operation circuits include a scrambler circuit that may perform

3   a scramble operation on the received data; and

4   the operation control store provides operational values that represent at

5   least one scrambling polynomial.

1   **11.**   The integrated circuit device of claim 9, wherein:

2   the operational control store includes circuits that may provide at least

3   one user operational value configured by a user and preset operational values

4   that may be established by at least one integrated circuit manufacturing step.

1   **12.**   The integrated circuit device of claim 6, wherein:

2   the communication portion includes a data (MUX) multiplexer that

3   enables a data path between one of a plurality of inputs and a data MUX

4   output, and each data operation circuit is coupled to an input of the data MUX.

1   **13.**   The integrated circuit device of claim 6, wherein:

2   the communication portion includes a physical layer circuit that

3   provides a data output stream compatible with a particular data transmission

4   media.

1   **14.**   The integrated circuit device of claim 6, wherein:

2   the at least one communication portion includes a plurality of

3   communication portions.

1   15.   A semiconductor device, comprising:

2   a programmable logic device having a communication portion

3   embedded therein, the communication portion including non-programmable

4   circuits designed to provide a selectable data communication function.

1   **16.**   The semiconductor device of claim 15, wherein:

2   the communication portion includes a plurality of circuit blocks that

3   each provides a different data communication function.

1   **17.**   The semiconductor device of claim 16, wherein:

2   the communication portion includes a selectable data path between

3   each circuit block and a data output.

1   **18.**   The semiconductor device of claim 15, wherein:

2   the communication portion includes a block converter circuit that

3   encodes input data words into output data words and a scrambler circuit that

4   scrambles data values according to an operational control value.

1   **19.**   The semiconductor device of claim 15, wherein:

2   the communication portion includes a block converter circuit that

3   decodes input data words into output data words and a de-scrambler circuit

4   that de-scrambles data values according to an operational control value.

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1   **20.**   The semiconductor device of claim 18, wherein:

2   the communication portion includes an operational control store that

3   provides selectable operational control values to the scrambler circuit.

21.) A method, comprising the steps of:

performing predetermined logic functions on a programmable logic portion of the integrated circuit; and

performing serial data communication functions on a communication portion of the integrated circuit that includes circuit blocks that are not synthesized.

22. The method of claim 21, wherein:

performing serial data communication functions includes

selecting a polynomial value from a number of polynomial values, and

scrambling serial data according to the selected polynomial value.

23. The method of claim 21, wherein:

performing serial data communication functions includes encoding serial data having words of a first bit length into serial data having words of a second bit length that is different than the first bit length.

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